

Work Order ID 83700

83700

Page 1

May-30-12 7:43:49 AM

Item ID: D350-748-201

Accept

N900040100

Setup

Start

NS1

Revision ID:

Item Name: Crosstube Installation, High Aft

Stop

NS2

Start Date: 4/23/12 Start Qty: 1.00 *1*

Cust Item ID:

Required Date: 5/07/12 Req'd Qty: 1.00 *1*

Customer:

Reference:

Approvals:

Process Plan:

Date:

Tooling:

Date:

Run

Start

NR1

QC:

Date:

SPC (Y/N):

Date:

Stop

NR2

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
Draw Nbr	Revision Nbr								
100		50	0.00						WU 12/06/25
100	DOCUMENT CONTROL						1		m 12/06/25
DC	Memo	0.00							
Document Control	Photocopy bluefile & type labels per PPPD350-748-201		CHG002						
110		0.00							
110	BENDING MACHINE - CROSSTUBES								
CNC Bend 2	Memo	0.00							
CNC Alpha 160 Bender	Bend tube as per Dwg D350-748-241 using CNC bender program D350A and Folio FT								
120	QC15- Crosstube Dimensional Check	50/00							
120	Memo	0.00							
QC									
Quality Control									

Issue P/O to MetCor 12/12/06/04
Rec'd - Inspect attached copy to w/o
Copy/12/06/04

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Stop

NS2

Start Date: 4/23/12 Start Qty: 1.00

1

Cust Item ID:

Required Date: 5/07/12 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals: Process Plan:

Date:

Tooling:

Date:

Run

Start

NR1

QC:

Date:

SPC (Y/N):

Date:

Stop

NR2

Sequence ID/
Work Center ID

Operation
Description

Set Up/
Run Hours

Tool ID

Tool #

Plan
Code

Accept
Qty

Reject
Qty

Reject
Number

Insp.
Stamp

125

125

HandFXtube

Hand Finishing Crosstubes

Memo

Stress relief

Heat treat crosstube as per QSI010 4.3

Temp: _____

Start time: _____

Finish time: _____

0.00

0.00

N/A

127

127

QC

Quality Control

Memo

0.00

0.00

12-05-30

12-5-10

For twist

6/10/10

Work Order ID 83700

83700

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May-30-12 7:43:49 AM

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Stop

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1

Cust Item ID:

Required Date: 5/07/12 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals: Process Plan:

Date:

Tooling:

Date:

Run

Start

NR1

QC:

Date:

SPC (Y/N):

Date:

Stop

NR2

Sequence ID/
Work Center ID

Operation
Description

Set Up/
Run Hours

Tool ID

Tool #

Plan
Code

Accept
Qty

Reject
Qty

Reject
Number

Insp.
Stamp

130

130

Crosstubes

Crosstubes

0.00

0.00

Memo
1-Drill Tube as per Dwg D350-748-241 Using DT8876 Drill Jigs,
Set-up drill table as per QSI 010

MO/RM

12-5-23

Crosstubes

2-Deburr

3-Engrave Part # and Batch # as per Dwg D350-748-241

4-Remove all marks from tube within limits of D350-748-241

5- Apply a light coat of LPS3 on the interior of tube

Batch: M45

Rm

12-5-24

140

140

QC

Quality Control

QC6- Inspect dimensions to drawing

0.00

5/12/05/30

Memo

0.00

Work Order ID 83700

83700

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Cust Item ID:

Required Date: 5/07/12 Req'd Qty: 1.00 *1*

Customer:

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Approvals: Process Plan:

Date:

Tooling:

Date:

Run

Start

NR1

QC:

Date:

SPC (Y/N):

Date:

Stop

NR2

Sequence ID/
Work Center ID

Operation
Description

Set Up/
Run Hours

Tool ID

Tool #

Plan
Code

Accept
Qty

Reject
Qty

Reject
Number

Insp.
Stamp

150

150

Outsource3

Outsource process - Cad plate

Outsource process-Cadplate per QSI017 4.1.9.1

0.00

CL 12/10/04 ①

Memo

0.00

Issue P/O: 17084

Stress relief at 375° for 5 hours

Magnetic Particle Inspect per ASTM E1444

Cadmium Plate per AMS-QQ-P-416B, Class 1, Type 2

Embrittle relief at 375° for 8 hours, Chromate Treat

Possible Supplier: Southwest United Industries

Ensure Certificate of Conformity is attached

160

160

Packaging

Packaging

Receive & Inspect for Damage & Mat'l Certs

0.00

PJF/15/01
12/10/04
PJF/15/01

Memo

0.00

Ensure certificate of conformity is attached

STAR W/D C&G ATTACHED

170

170

QC

Quality Control

QC5- Inspect part completeness to step on W/O

0.00

0.00
S. H. Davis

NPT

P/O: 17258

CL 12/10/04 X1

rec'd

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector
11.10.13	161	LOAD TUBE TO 3000 ^{lb} FOR 1 MINUTE REF D.S. EMAIL	P	12/6/13	1	P	12/6/13
11.10.13	162	NDT TUBE					

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)							
DATE	STEP	Description of NC Section A	Corrective Action		Section B		Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date				

NOTE: Date & initial all entries

Chris Provencal

From: David Shepherd <dshepherd@dartaero.com>
Sent: Tuesday, April 27, 2010 3:40 PM
To: 'Mike Petsche'
Cc: 'Bill Beckett'; 'L Lacelle'; 'Chris Provencal'; 'Dan Stow'; ssheldon@dartaero.com
Subject: 350 crosstubes

Mike,

I discussed the 350 crosstube load testing with Bill a little while ago and this plan makes sense to him.

So, my recommendation to clear these crosstubes is to load the fwd crosstubes to 3500 lb and the aft crosstubes to 3000 lb in the deflection test rig and document on the work orders that this test has been completed. Hold max load for 1 minute. Per TP-D350-748-2, these loads represent the maximum load on these crosstubes at gross weight and are below the yield point of the material. I would like to request that Chris Provencal witness these tests and sign off the work orders based on his experience with Dart landing gears. My feeling is that if there is a problem with the parts, it will manifest itself during this load test. I, for one, would feel a lot more confident in testing each crosstube in this manner than relying totally on what Exova has to say. I think it would be very difficult to reach a conclusion on the whole batch on the basis of cracks in two parts from the batch.

I believe that we can accomplish this before next Friday, which also gives us time to hear what Exova has to say in case it has an impact on our decision. So far, what I have seen from Exova shows me that there are fluctuations in the heat treating but the tubes are heat treated to our specification.

For this reason, I believe we should tell DHS that it looks like we will be able to start shipping 350 crosstubes by May 7th pending a successful Engineering test of the material.

David.

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Start

NS1

Revision ID:

Item Name: Crosstube Installation, High Aft

Start Date: 4/23/12 Start Qty: 1.00

1

Cust Item ID:

Required Date: 5/07/12 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals:

Process Plan:

Date:

Tooling:

Date:

Run

Start

NR1

QC:

Date:

SPC (Y/N):

Date:

Stop

NR2

Sequence ID/
Work Center ID

Operation
Description

Set Up/
Run Hours

Tool ID

Tool #

Plan
Code

Accept
Qty

Reject
Qty

Reject
Number

Insp.
Stamp

180

180

SprayPaint

0.00

1

W 12-06-19

SprayPaint

Memo

0.00

Spray Painting

1-Prime inside crosstube as per QSI 005 4.2
2-Paint Outside of Tube as per Dart QSI 005 4.2

190

QC14- Inspect Spray Paint

0.00

①

②

12-06-21

QC

Quality Control

Memo

0.00

Then, Wrap in plastic bag to protect from scratches

200

200

Crosstubes

0.00

A8

12 - 6 - 21

Crosstubes

Memo

0.00

1-Install Ground wire Insert,then insert screw and washer
2-Install Abrasion strips as per Dwg D350-748-241 & QSI 035.
3-Install supports Using D18876 as per Dwg D350-748-241,Torque to 60-80 IN-LBS

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May-30-12 7:43:49 AM

Item ID: D350-748-201

Accept

N900040100

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Revision ID:

Item Name: Crosstube Installation, High Aft

Stop

NS2

Start Date: 4/23/12 Start Qty: 1.00 *1*

Cust Item ID:

Required Date: 5/07/12 Req'd Qty: 1.00 *1*

Customer:

Reference:

Approvals: Process Plan:

Date:

Tooling:

Date:

Run

Start

NR1

QC:

Date:

SPC (Y/N):

Date:

Stop

NR2

Sequence ID/
Work Center ID

Operation
Description

Set Up/
Run Hours

Tool ID

Tool #

Plan
Code

Accept
Qty

Reject
Qty

Reject
Number

Insp.
Stamp

210

QC5- Inspect part completeness to step on W/O

0.00

1

12/06/24

210

QC

Quality Control

220

Pick Kit

0.00

12/12/24

220

Packaging

Packaging

Memo

0.00

230

QC4- 100% Inspect kits for completeness

0.00

1

12/06/25

230

QC

Quality Control

Memo

0.00

Work Order ID 83700

83700

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May-30-12 7:43:49 AM

Item ID: D350-748-201

Accept

N900040100

Setup

Start

NS1

Revision ID:

Item Name: Crosstube Installation, High Aft

Stop

NS2

Start Date: 4/23/12 Start Qty: 1.00 *1*

Cust Item ID:

Required Date: 5/07/12 Req'd Qty: 1.00 *1*

Customer:

Reference:

Approvals:	Process Plan:	Date:	Tooling:	Date:	Run	Start	*NR1*
	QC:	Date:	SPC (Y/N):	Date:	Stop		*NR2*

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
240 *240* Packaging	Packaging	0.00							12/6/25f
Packaging	Memo	0.00							
	Identify and pack for shipping as per PPPD350-748-201								
	Location: <u>3</u>								
PPP Rev: <u>B</u>									
250 *250* QC	QC21- Final Inspection - Work Order Release	0.00							MCJ 12/06/25
Quality Control	Memo	0.00							

Picklist Print

May-30-12 7:43:48 AM

Page 1

Work Order ID: 83700**Parent Item:** D350-748-201**Start Date:** 4/23/12**Required Date:** 5/07/12**Parent Item Name:** Crosstube Installation, High Aft**Start Qty:** 1.00**Required Qty:** 1.00**Comments:** IPP Rev: A New Issue 06-07-05 JLM

IPP Rev: B Update qty of MS21042L5 06-09-12 KJ

IPP Rev C Combined manufacturing 08.04.02 EC verified by: DD

IPP Rev:D 08-06-24 revD as per dwg DD verified by:EC

IPP Rev: E 08.12.11 Step17 was step 21 KJ Verified by:EC IPP Rev:F 10.08.04 added QSI010

4.3 DD verf:EC IPP REV:G ADD UNDER BEND COMMENT 12-05-28 JLM

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
ALS4-1032-225 Insert		Purchased	No			200	Each	819.0000	1	1		AB	12 - 6 - 22
				<u>Location</u>		<u>Loc Qty</u>		<u>Loc Code</u>					
				ST281		796							
					108696	146							
					110768	62							
					118386	55							
					118966	68							
					(121269)	465							(1)
				ST282		23							
					120410	10							
					120451	13							
AN4-41A Bolt		Purchased	No			220	Each	539.0000	8	8			12/6/22
				<u>Location</u>		<u>Loc Qty</u>		<u>Loc Code</u>					
				360		181							
					121185	181							
				ST360		358							
					115108	3							
					115705	7							
					118451	29							
					118838	50							
					(119328)	100							8
					120423	150							
					121205	15							
					121573	4							

Picklist Print

May-30-12 7:43:48 AM

Page 2

Work Order ID: 83700**Parent Item:** D350-748-201**Start Date:** 4/23/12**Required Date:** 5/07/12**Parent Item Name:** Crosstube Installation, High Aft**Start Qty:** 1.00**Required Qty:** 1.00**AN4-6A
Bolt**

Purchased

No

220

Each

1,514.0000

16

16

<u>Location</u>	<u>Loc Qty</u>	<u>Loc Code</u>
355	222	
121631	222	
ST356	1292	
119017	792	
121243	500	

**AN5-32A
Bolt**

Purchased

No

220

Each

245.0000

4

4

<u>Location</u>	<u>Loc Qty</u>	<u>Loc Code</u>
ST339	145	
119862	50	
120423	75	
120910	20	
ST340	100	
121541	100	

**AN960JD10
Washer**

NAS1149D0363J

Purchased

No

121524

200

Each

0.0000

①

1

1

AB 12-6-22

**AN960JD416
Washer**

NAS1149D0463J

Purchased

No

220

Each

30.0000

32

32

M12/9/22

**AN960JD516
Washer**

NAS1149D0563J

Purchased

No

ST351

30

116289

10

119097

20

220

Each

0.0000

8

M119548

12/10/22

Picklist Print

May-30-12 7:43:48 AM

Page 3

Work Order ID: 83700

Parent Item: D350-748-201

Start Date: 4/23/12

Required Date: 5/07/12

Parent Item Name: Crosstube Installation, High Aft

Start Qty: 1.00

Required Qty: 1.00

D2856-400	Manufactured	No	200	f	242.5445	1.181	1.2431579	<i>AL 12-6-21</i>
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Abrasion Strip

1-cut as per dwg D2856

<u>Location</u>	<u>Loc Qty</u>	<u>Loc Code</u>
-----------------	----------------	-----------------

ST403	216	<i>(81875)</i>
	216	
ST409	26.5445	<i>1.2</i>
63735	0.6696	
68076	0.3149	
71164	8.46	
79551	17.1	

D3500-1	Manufactured	No	220	Each	75.0000	4	4	<i>SD</i>
---------	--------------	----	-----	------	---------	---	---	-----------

Saddle

<u>Location</u>	<u>Loc Qty</u>	<u>Loc Code</u>
-----------------	----------------	-----------------

ST423	14	
78595	14	
ST424	31	<i>1</i>
<u>73405</u>	20	
<u>73406</u>	8	
<u>76000</u>	3	<i>3</i>
ST425	30	
76940	30	

D3501-1	Manufactured	No	220	Each	367.0000	16	<i>12/6/16 ✓P</i>
---------	--------------	----	-----	------	----------	----	-------------------

Bushing

<u>Location</u>	<u>Loc Qty</u>	<u>Loc Code</u>
-----------------	----------------	-----------------

ST051	367	
67757	4	
73391	6	
74866	207	
77033	61	
81955	26	
<u>83253</u>	63	<i>(b)</i>

Picklist Print

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Work Order ID: 83700**Parent Item:** D350-748-201**Parent Item Name:** Crosstube Installation, High Aft**Start Date:** 4/23/12**Required Date:** 5/07/12**Start Qty:** 1.00**Required Qty:** 1.00**D3502-1**
Support

Manufactured No

200 Each 21.0000

2 2

*AF 12-6-21*Location Loc Qty Loc CodeST051 21
73419 11
74873 10**D350-748-241TRN**
Crosstube Turning Detail

Manufactured No

110 Each 2.0000

1 1

Location Loc Qty Loc CodeLG *73372* 2
61314 0
61315 0
79393 1
83287 1**MS21042L4**
Nut

Purchased No

220 Each 4,059.0000

24 24

*JW 12-5-10*Location Loc Qty Loc CodeST300 4059
119075 125
121011 677
121444 2957
121652 300**MS21042L5**
Nut

Purchased No

220 Each 1,447.0000

4

*12/6/12*Location Loc Qty Loc Code300 500
121652 500
ST300 947
108827 8
116105 5
116548 43
117611 18
119109 865
17651 8

Picklist Print

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Work Order ID: 83700**Parent Item:** D350-748-201**Parent Item Name:** Crosstube Installation, High Aft**Start Date:** 4/23/12**Required Date:** 5/07/12**MS21920-20**

Clamp (per MIL-DTL-8783C)

Purchased No

200 Each 86.0000

2 2

AB 12-6-21

<u>Location</u>	<u>Loc Qty</u>	<u>Loc Code</u>
LG050	86	
116799	8	
120676	8	
121067	20	(3)
121274	50	

MS27039-1-10

Screw

Purchased No

200 Each 126.0000

1 1

AB 12-6-21

<u>Location</u>	<u>Loc Qty</u>	<u>Loc Code</u>
GA	100	
120449	100	
ST291	26	
120120	26	

DART AEROSPACE LTD	Work Order:	83700
Description: Crosstube High Aft (AS350/355)	Part Number:	D350-748-201
Inspection Dwg: D350-748-241 Rev: E F		Page 1 of 1

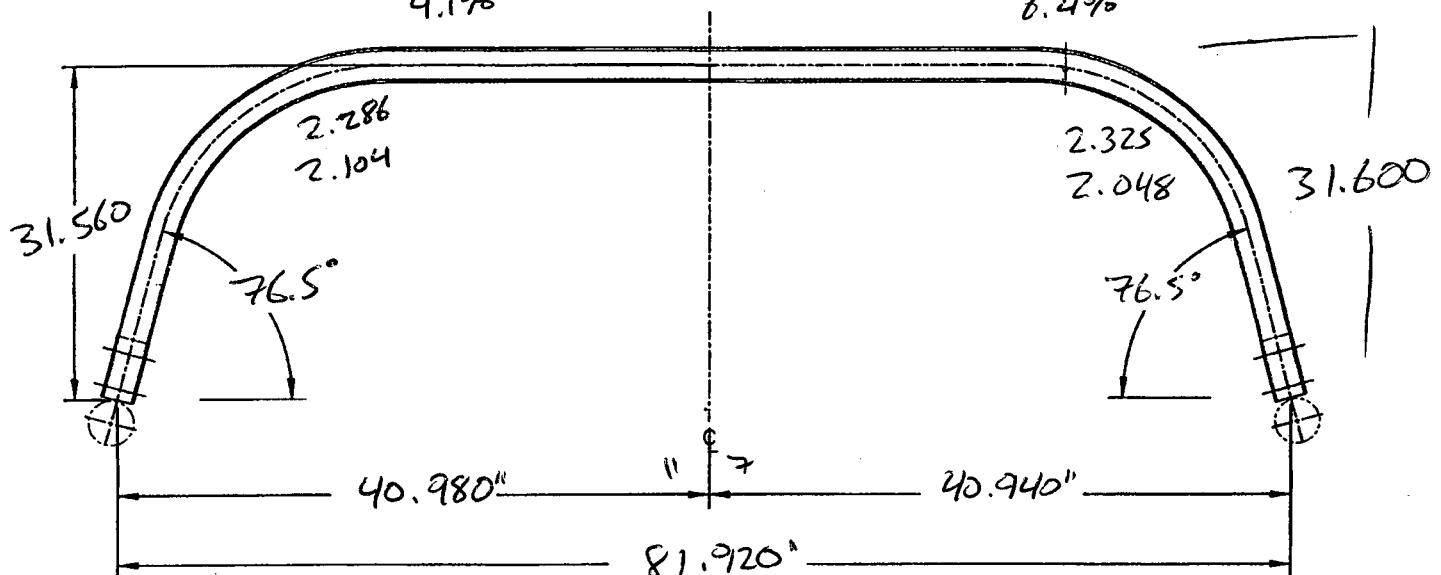
Required Dimension	Min	Max
Height	31.22	31.48
1/2 Span	40.77	41.03
Angle	75	77
Total Span	81.54	82.06

$$0.182 \div 4.390$$

4.1%

$$0.281 \div 4.377$$

6.4%



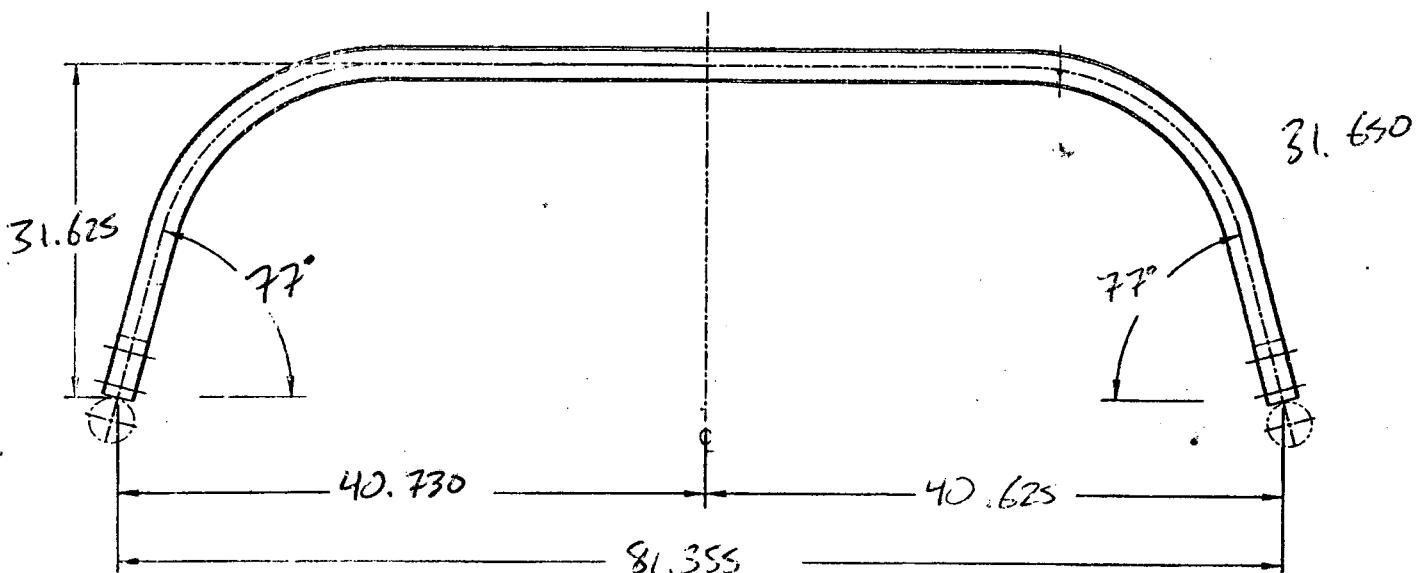
Comments
Side A = 4.1% crushing @ 11 passes
Side B = 6.4% crushing @ 7 passes
twist = 0.494
tube is linked. OK 12-5-22

QC15 Inspection	18
Date	12-01-25

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM	
B	10.08.23	Dwg Rev updated	KJ	J

DART AEROSPACE LTD	Work Order:	83700
Description: Crosstube High Aft (AS350/355)	Part Number:	D350-748-201
Inspection Dwg: D350-748-241 Rev: E		Page 1 of 1

Required Dimension	Min	Max
Height	31.22	31.48
1/2 Span	40.77	41.03
Angle	75	77
Total Span	81.54	82.06



Rev 12-5-17

Comments
TWIST = 0.270
Acceptable CP 12.05.17 QSI OML

QC15 Inspection	
Date	

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM	
B	10.08.23	Dwg Rev updated	KJ	JF

६८०

8 7 6 5 4 3 2 1

D

F

Item	Qty	Part Number	Description
1	X	D350-748-241	CROSSTUBE ASSEMBLY (AS 350/355 HI AFT)
2	1	D6015-125	CROSSTUBE (OR D6018-125)
3	2	D3502-1	SUPPORT
4	2	D2856-400-710	ABRASION STRIP
5	1	AELS-1032-225	INSERT
6	1	NAS1149D0363J	WASHER (OR AN960JD10)
7	2	MS21920-20	CLAMP (PER DART SPEC. M-MS21920-20)
8	1	MS27039-1-10	SCREW

C

GENERAL NOTES:

F 1) MATERIAL: MANUFACTURED FROM D6015-125 OR D6018-125
FINISHED LENGTH = 122.700±0.06

F 2) FINISH: MAGNETIC PARTICLE INSPECT PER DART QSI 038 4.2
CADMIUM PLATE PER AMS-QQ-P-416B, CLASS 1, TYPE II
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2

F 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.

F 4) UNITS: INCHES UNLESS OTHERWISE NOTED.

F 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.

F 6) IDENTIFICATION: DART PART NUMBER "D350-748-241" AND BATCH NUMBER ON INSIDE OF CUFF
PER DART QSI 044 6.4 (VIBRATING STYLUS)

F 7) WEIGHT: 29.85 lbs

F 8) PART IS SYMMETRIC ABOUT CENTERLINE, EXCEPT FOR Ø0.297 HOLE.

F 9) RUN CUTTER OFF PART WHERE INDICATED. BLEND OUT ALL EDGES FROM MACHINING
LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH. NOTE: ALL HOLES ARE DRILLED AFTER
BENDING.

F 10) BEND PROGRESSIVELY WITH A MINIMUM OF 7 PASSES. MAXIMUM TUBE FLATTENING DUE TO
BENDING IS 6% BASED ON O.D.

F 11) HEAT TREAT TO MIN. 180 KSI PER MIL-T-6736 OR AMS 2759-1C AFTER TURNING. ACCEPTABLE TO
VERIFY TENSILE STRENGTH BY HARDNESS TEST PER ASTM E18 TO 40-45 HRC.

F 12) INSTALL D2856-400-710 ABRASION STRIPS WITH A GAP ON BOTTOM SIDE OF CROSSTUBE,
CENTERED OPPOSITE D3502-1 SUPPORT, PER QSI 035.

F 13) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE
OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES,
NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY.
CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE. WHEN DRILLING HOLES EXTREME CARE
MUST BE TAKEN AND CAREFUL DEBURRING PERFORMED TO ENSURE A CLEAN HOLE WITH NO
CRACKING/CHIPPING/GROOVES.

F 14) TORQUE CLAMPS 60 TO 80 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT
NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

F 15) MAX TWIST AFTER BENDING: WITH XTUBE LAYED FLAT ON SURFACE, THE DIFFERENCE BETWEEN
CUFF HEIGHTS FROM THE SURFACE MAY BE NO LARGER THAN 0.25 (ZN C1-3).

B

F

F

(3700)
12-4-24 MJ

RELEASED
R 2011-01-08
MJ

F	ADD HRC TEST OPTION (B8-1) PER PAR 09-040, ADD TWIST LIMIT (A8-1, C1-3), ADD D6015-125 OPTION (C8-1), STOCK DIM NOW MACHINED (D1-4)	CP	10.11.23
E	REVISE GENERAL NOTES; UPDATE TO CURRENT STANDARDS; RELOCATED FLAG #6 PER PAR 08-046 (ZN A8-3); ADD TOLERANCES (ZN C6-3, D2-3)	RF	09.09.30
D	MAG. PARTICLE AND CAD PLATING AS MFD.	CP	06.10.31
C	ADD CAD PLATING	CP	06.08.14
B	ADD D6018-125 & PRIME AND PAINT	CP	06.06.30
A	NEW ISSUE	CP	06.03.31
REV.	DESCRIPTION	BY	DATE
DESIGN	99	DART AEROSPACE LTD	
DRAWN	99	HAWKESBURY, ONTARIO, CANADA	
CHECKED	15	DRAWING NO.	REV. F
MFG. APPR.	EG	D350-748-241	SHEET 1 OF 4
APPROVED	EG	TITLE	SCALE
DE APPR.	EG	CROSSTUBE (AS 350/355 HI AFT)	NTS
DATE	10.11.23	COPYRIGHT © 2006 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OTHER THAN THE CONTRACTUAL AGREEMENT WITH OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.	

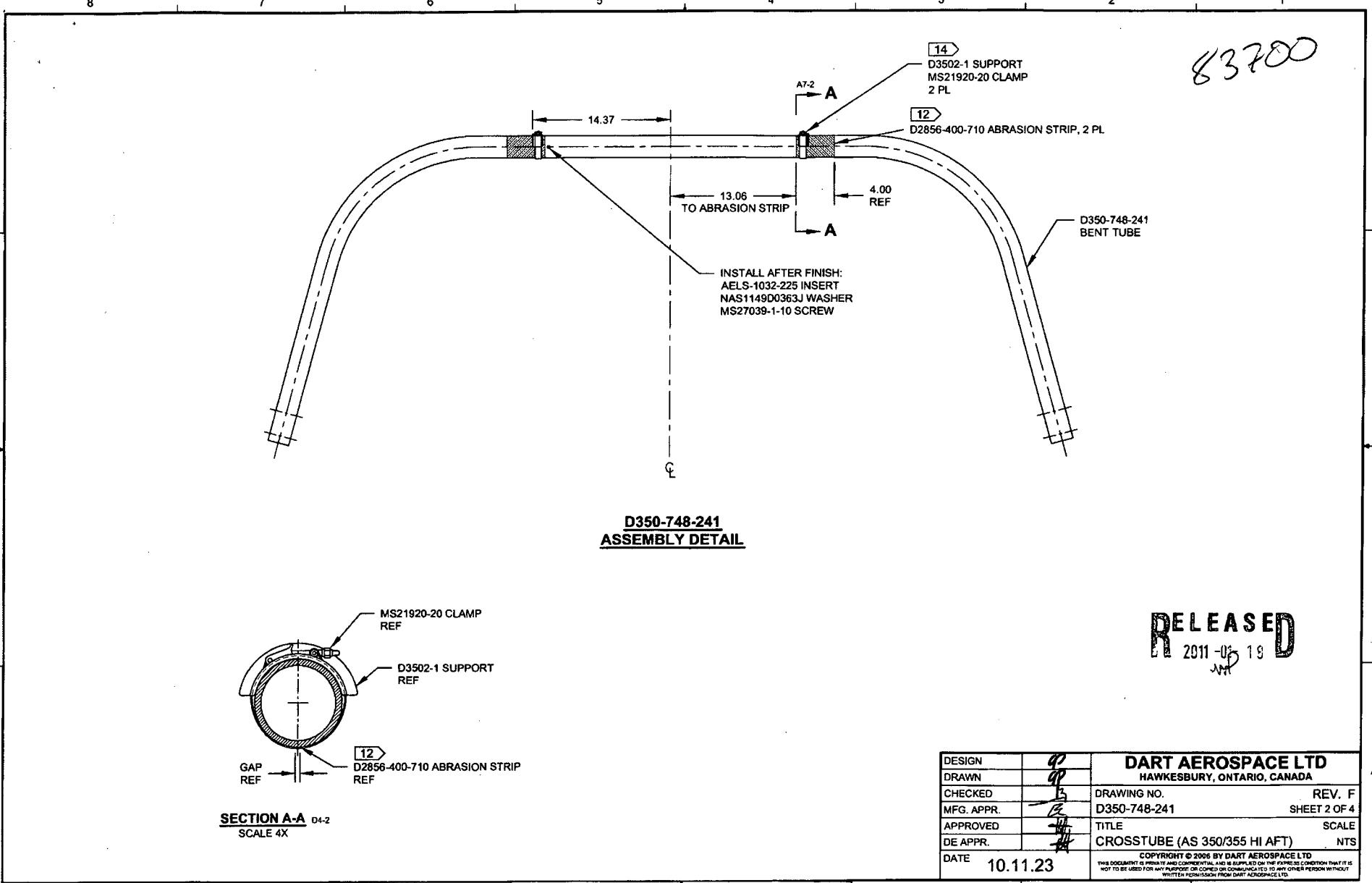
8 7 6 5 4 3 2 1

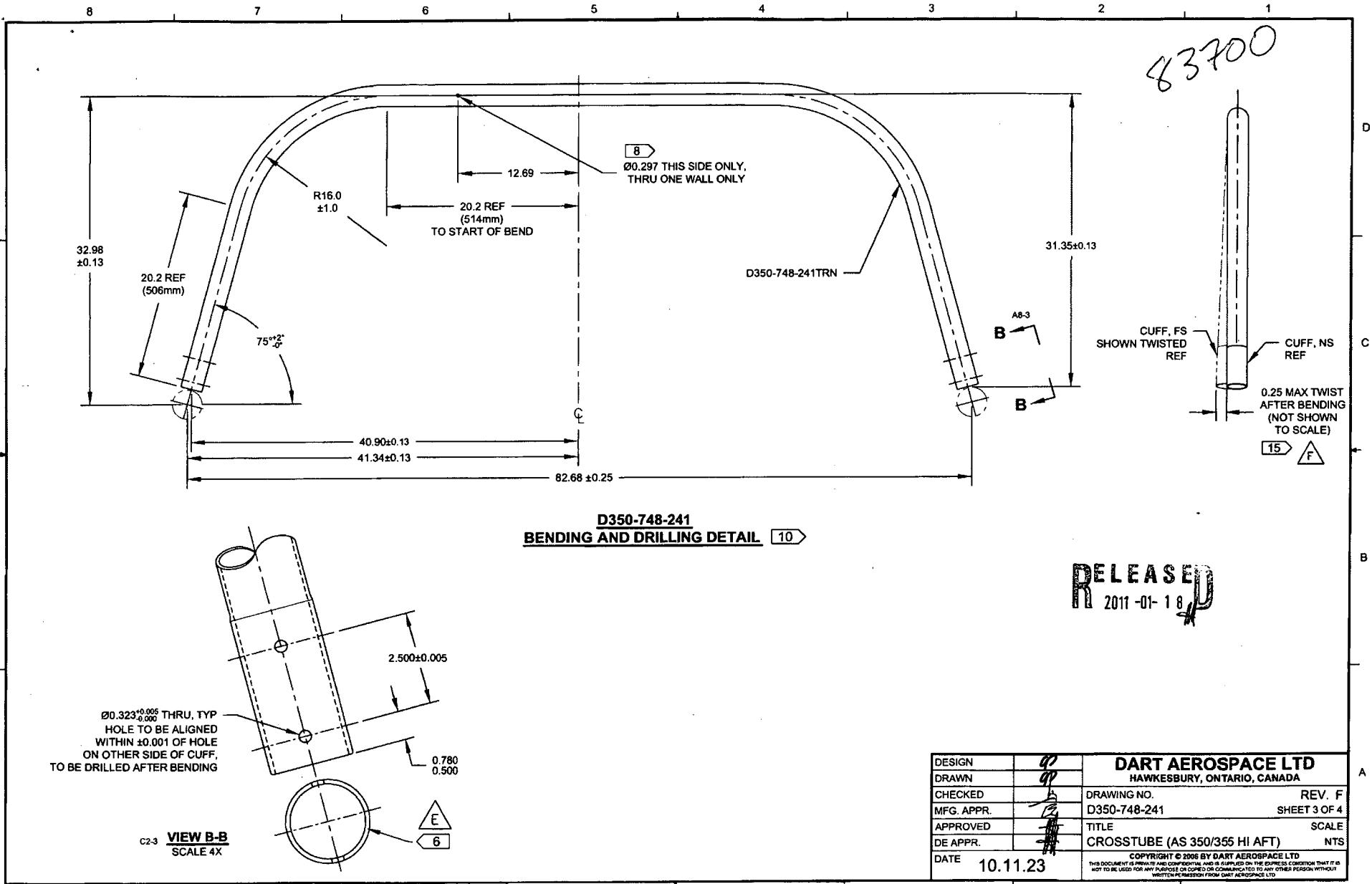
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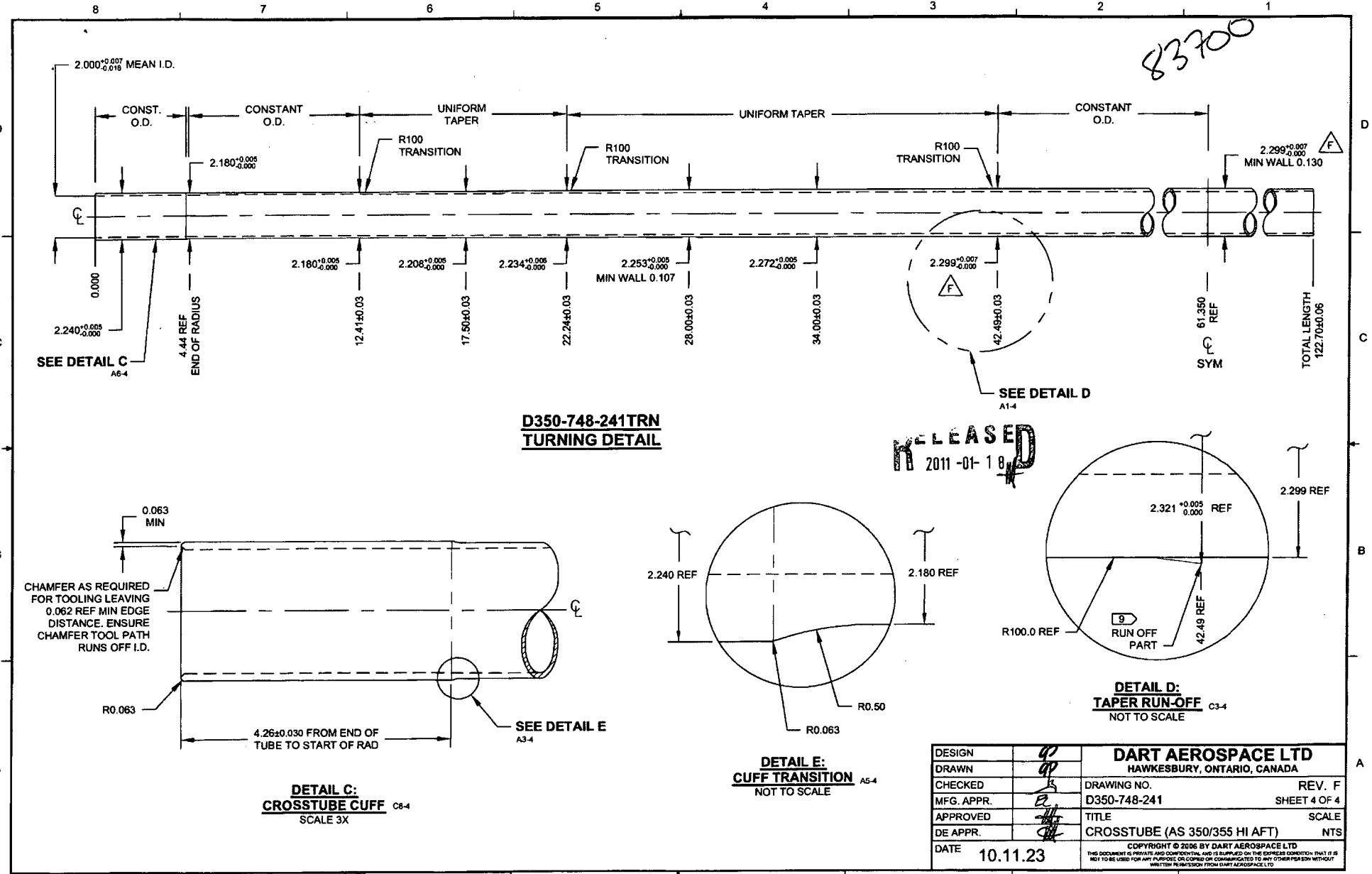
C

B

A







METCOR INC.

560 BOUL. ARTHUR-SAUVÉ
ST-EUSTACHE, QC, J7R 5A8

Tel: 450-473-1884 / Fax: 450-491-5498

Certificat de Conformité Détaché

Detailed Certificate of Compliance

BON DE TRAVAIL order	CHARGEMENT load
175881	1

CLIENT / customer 215

DART AEROSPACE
1270 ABERDEEN
HAWKESBURY

ON K6A 1K7

LIVRÉ À / shipped to:

DART AEROSPACE
1270 ABERDEEN
HAWKESBURY

ON K6A 1K7

1

COMMANDE DU CLIENT customer po	BON DE LIVRAISON DU CLIENT customer shipper no.	MATÉRIEL material	CODE DE TRAITEMENT mat'l heat code	NUMÉRO DE LOT lot number
16942		Steel		

SPÉCIFICATIONS DU PROCÉDÉ processing specifications

STRESS REL

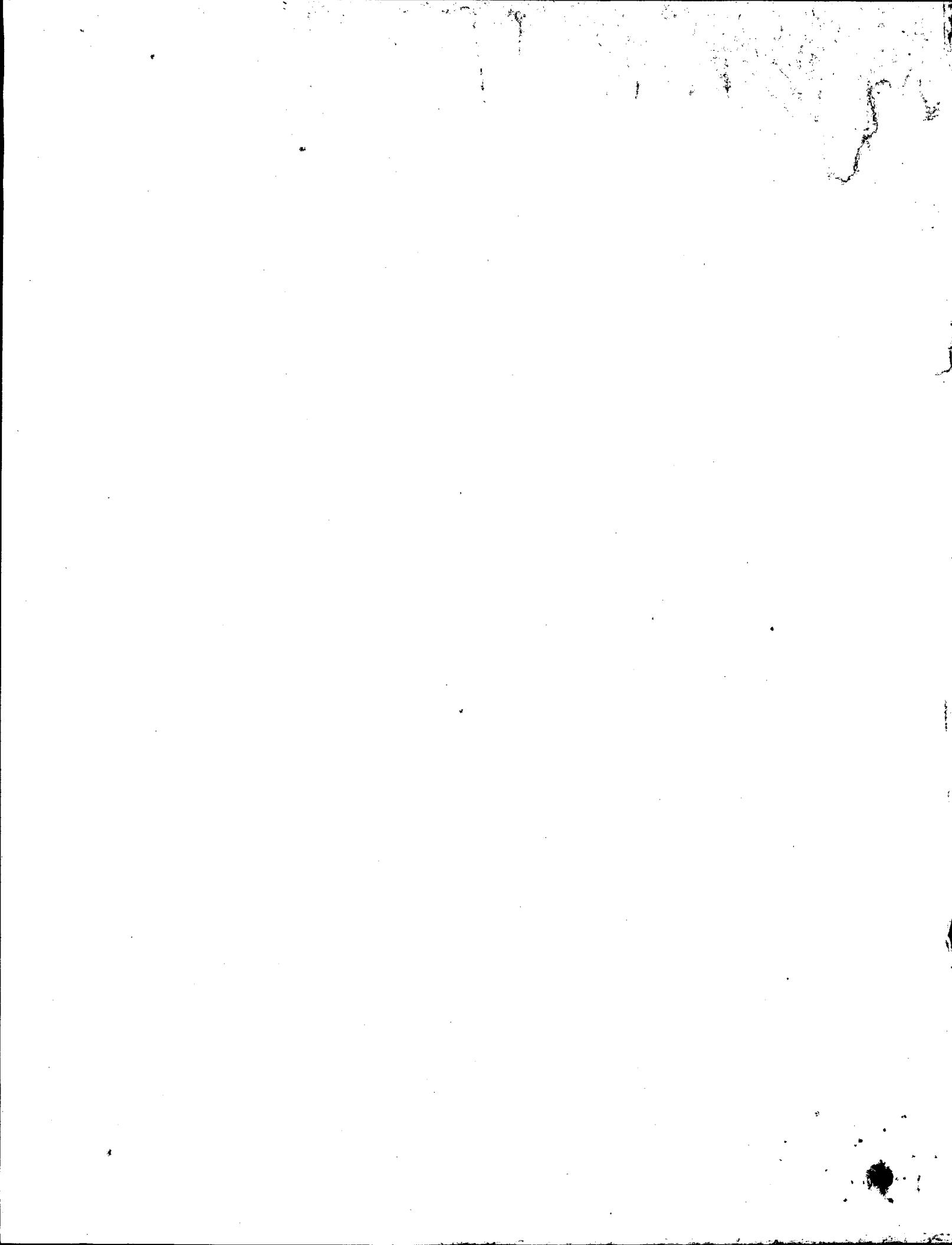
SAE AMS 2759/1 REV.E

EXIGENCE / requirement SPÉCIFICATIONS / specified TESTS EXÉCUTÉS / performed RÉSULTATS DE TESTS / results

Visual

QUANTITÉ quantity	POIDS weight	DESCRIPTION DES PIÈCES parts description
7	210	<p>D350-748-101 (1) CROSSTUBE</p> <p>(1) D350-748-101 CROSSTUBE</p> <p>(1) D350-748-201 CROSS TUBE</p> <p>(1) D350-748-201 CROSS TUBE</p> <p>(1) D350-748-201 CROSS TUBE</p> <p>(1) D350-748-201 CROSS TUBE</p> <p>CONTENANT: 1 PALETTE</p>

Operation	Temps spécifiée Specified Temp	Temps de trempe Spécifié Specified Soak Temp	Atmosphere	Carbone Carbon Potential	Q-Media Q-Temp	Four # Furnace #	Date Départ Start Date	Heure d'entrée Time In	Heure de sortie Time Out	Date Complétée Date complete
1,00 CONT. INIT.	LAVAGE	si nécessaire								



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HAWKESBURY

LIVRÉ À / shipped to:

DART AEROSPACE
1270 ABERDEEN
HAWKESBURY

ON K6A 1K7

Operation	Temp. spécifiée Specified Temp	Temps de trempe Spécifié Specified Soak Temp	Atmosphere	Carbone Carbon Potential	Q-Media Q-Temp	Four # Furnace #	Date Départ Start Date	Heure d'entrée Time In	Heure de sortie Time Out	Date Complétée Date complete
2,00 COMPTAGE PREPARATION										
3,00 STRESS RELIEF	650	2 hrs 30 minutes	air			701				
4,00 FINAL INSP							05-11-2012			05-11-2012

COMMENTAIRES / comments

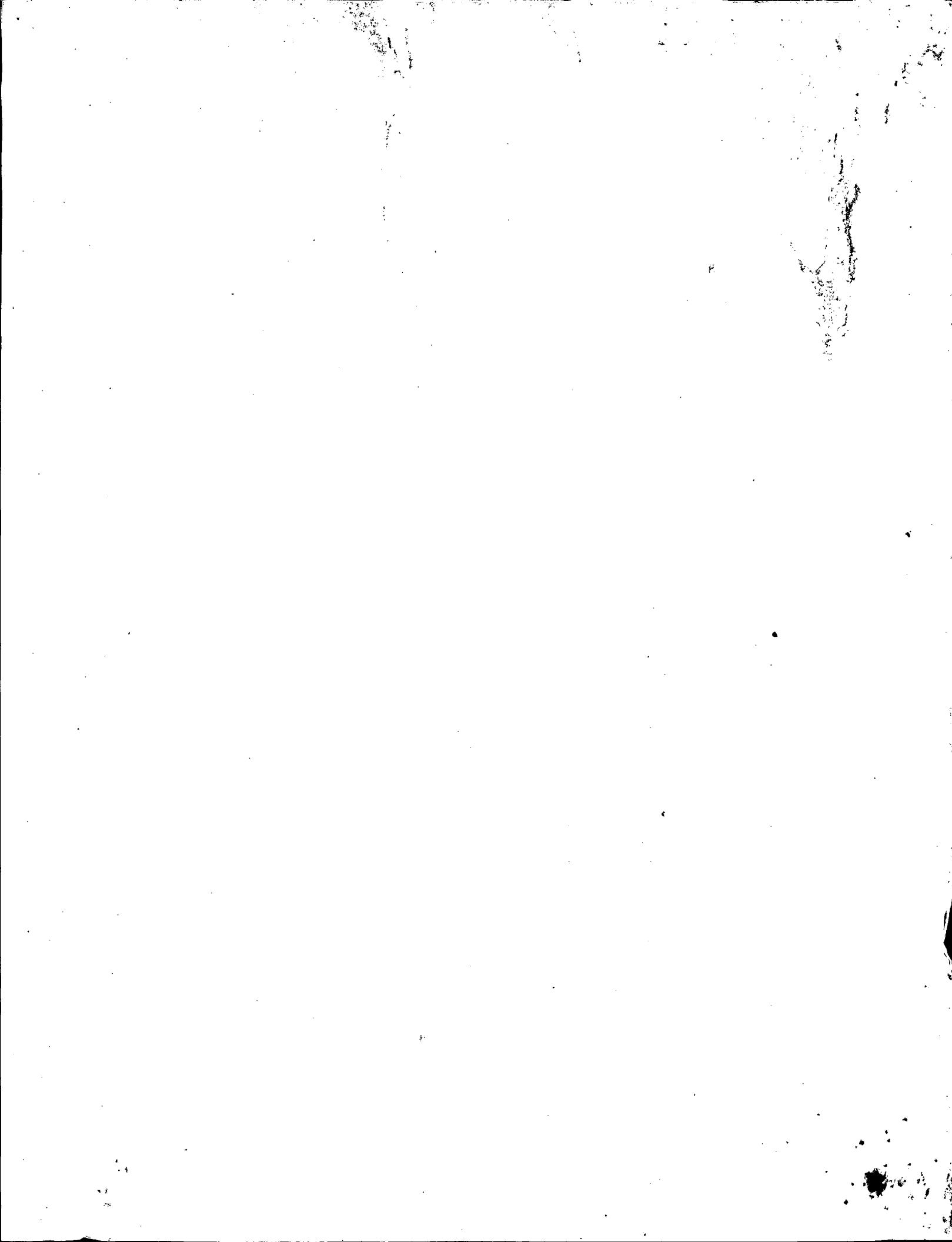
ALL THE HEAT TREATMENT PROCESSING PERFORMED ON THIS ORDER WAS ACCOMPLISHED USING HEAT TREATMENT EQUIPMENT THAT MEETS THE REQUIREMENTS OF AMS 2759. ALL THE HEAT TREATMENT OPERATIONS WERE ACCOMPLISHED IN ACCORDANCE WITH THE REQUESTED/REQUIRED HEAT TREATMENT SPECIFICATION AND ALL REQUIRED VERIFICATIONS TEST HAVE BEEN PERFORMED AND DOCUMENTED. NO UNAUTHORIZED CHANGES OR DEVIATIONS TO REQUIRED HEAT TREATMENT SPECIFICATIONS OR PROCEDURES HAVE BEEN PERFORMED.

APPROUVÉ par / Approved by:



DATE: 2012-05-11

/ Nous certifions que toute l'information comprise sur ce rapport est exacte et conforme aux requis du client./We certify that all the information on this report is exact and in accordance with the order requirements.



CERTIFICATE OF
CONFORMANCE

CADORATH PLATING CO. LTD.

2150 LOGAN AVENUE

WINNIPEG, MANITOBA R2J-0J1

DATE: Jun-12-2012

CONSIGNÉ TO: Dart Aerospace Ltd.
1270 Aberdeen St.
Hawksbury, ON K6A 1K7

W/O #: 114962
INVOICE #: 60875

CONTRACT OR
PURCHASE ORDER # PO17084

DESCRIPTION: CROSSTUBE

P/N # D350-748-201

QTY 1

S/N # 83700

STRESS RELIEVE HEAT CHART # 12-546. MPI-IAW ASTM-E-1444.
CADMIUM PLATE IAW AMS-QQP-416C TYPE 2 YELLOW CLASS.
BAKE HEAT CHART # 12-573. MPI IAW ASTM-E1444.

Si7loelie

CERTIFICATE: I certify that the items indicated hereon have been inspected and tested and conform to all specifications and requirements detailed on the contract or purchase order.

Approved Inspector:

CAI
08



LIQUID PENETRANT TEST REPORT

P- 12187

CLIENT	Dart Aerospace			DATE	June 19/2012	PAGE	1	OF	1
ATTENTION	MATT / LINDA			ACUREN JOB NO.	188-12-C0265	TIME	AM <input checked="" type="checkbox"/>	PM <input type="checkbox"/>	
ADDRESS	1220 ABERDEEN STN HAWKESBURY, ON.			PO/WO NO.	17084 -	WORK LOCATION	SAME		
PROJECT				ACCEPTANCE STD.	ASTM 1417/01-088	REV./DATE	2005		
ITEM(S) EXAMINED	(6 PCS)			F.P.I.	ON CROSS TUBES	SEE RESULTS			

B DESCRIPTION	PROCEDURE NO. LT	2002 REV./DATE	2008	TECHNIQUE NO. LT	12187	REV./DATE	2008
PT NO.	SEE RESULTS			MATERIAL	4130 STEEL	THICKNESS	VARIOUS
SCOPE	+ WET FLUORESCENT LIQUID PENETRANT INSPECTION WAS DONE 100% ON THE EXTERNAL SURFACE ONLY						
TEST DETAILS							
METHOD	<input checked="" type="checkbox"/> FLUORESCENT	<input type="checkbox"/> VISIBLE	<input checked="" type="checkbox"/> WATER WASH	<input type="checkbox"/> SOLVENT REMOVABLE	<input type="checkbox"/> POST EMULSIFIED		
FAMILY BRAND	MAGNAFLUX			BLACK LIGHT S/N 16459	OUTPUT > 1000 μW/cm²	<input type="checkbox"/> AMBIENT < 2 fc	
PENETRANT	ZL67	MINIMUM DWELL TIME	45 10 MIN.	LIGHTING EQUIP.	<input type="checkbox"/> FLASHLIGHT	<input type="checkbox"/> TROUBLELIGHT	<input type="checkbox"/> OUTPUT > 100 fc @ SURFACE
PENETRANT REMOVER	H2O	MINIMUM DRY TIME	>10 MIN.	OTHER	LAB. NO		
DEVELOPER	SKD52	MINIMUM DWELL TIME	10 MIN.	LIGHT METER S/N	109886	CAL'D DATE	JUN 19 2012
DEVELOPER TYPE	<input checked="" type="checkbox"/> NON AQUEOUS	<input type="checkbox"/> AQUEOUS	<input type="checkbox"/> DRY				

SURFACE CONDITION	<input type="checkbox"/> AS GROUND	<input type="checkbox"/> AS WELDED	<input checked="" type="checkbox"/> MACHINED	<input type="checkbox"/> SHOT BLASTED	<input checked="" type="checkbox"/> CLEAN BARE METAL
SURFACE TEMPERATURE	<input type="checkbox"/> < -4°C/ 20°F	<input type="checkbox"/> -4°C/ 20°F TO 10°C/50°F	<input checked="" type="checkbox"/> 10°C/50°F TO 52°C/125°F	<input type="checkbox"/> > 52°C/125°F	
RESULTS-	<input checked="" type="checkbox"/> METRIC	<input type="checkbox"/> IMPERIAL			

W.O. CROSS TUBES	83700	✓		JUL 06 19
1 - " " 83695	✓			
1 - " " 83694	✓			
1 - " " 84381	✓			
1 - " " 81516	✓			
1 - " " 83299	✓			

Scope of Services
 An agreement of Acuren Group Inc. to perform services extends only to those services provided for in writing. Under no circumstances shall such services extend beyond the performance of the requested services. It is expressly understood that descriptions, comments and expressions of opinion reflect the opinions or observations of Acuren Group Inc. based on information and assumptions supplied by the owner/operator and are not intended nor can they be construed as warranties. Acuren Group Inc. is not assuming any responsibilities of the owner/operator and the owner/operator retains complete responsibility for the engineering, manufacture, repair and use decisions as a result of other information provided by Acuren Group Inc. In no event shall Acuren Group Inc.'s liability in respect of the services referred to herein exceed the amount paid for such services.

Normal services provided, Acuren Group Inc. uses the degree, care and skill ordinarily exercised under similar circumstances by others performing such services in the same or similar locality. No other warranty, expressed or implied, is intended by Acuren Group Inc.

SIGNATURES			
REPRESENTATIVE	Matthew Murdoch	SIGNATURE	DTR # E-63501
PRINT			
TECHNICIAN (SIGNATURE):			
NAME (PRINT):	Mike Joffreton		
TECHNICIAN	2 ND TECHNICIAN		
CGSB LEVEL	SNT LEVEL	CGSB LEVEL	SNT LEVEL
CGSB REG. NO.	0606	CGSB REG. NO.	
REPORT REVIEWED BY:		NAME INITIALS	

WHITE - CLIENT COPY

CANARY - OFFICE COPY

PINK - TECHNICIAN COPY

GOLD - OFFICE COPY